

Response from the IET specifically on Mobile Communications Infrastructure for the Digital Age

*A challenging and radical response to the Open Letter from
DCMS on - **A Communications Review for the Digital Age***

June 20011

Executive Summary

The UK needs *a radical shift in Mobile Communications policy ...a new Communications Act* is timely.

This change begins with the Government defining a national ambition for our UK Mobile Infrastructure to support UK competitiveness, investment and innovation (eg Ambition UK 2025)

A reformed and modernised UK network regulatory framework then needs to fully support this ambition. It is not about more regulation but the right regulation.

The current UK network regulatory framework has become a barrier to new network investment and consumer choice. Scored on a scale of 1 (abysmal) to 10 perfect...it has been trending from around 7 (10 years ago) down to a projected 2 in around 5 years time. Urgent action is needed.

Some issues will need to be resolved at the EU level – for example revised customer equipment type-approval regime, moving from micro-regulation to investment led policies, and reacting to new WHO advice on mobile phone health.

The IET would welcome the chance to help & discuss this response with Officials

The three big mobile communications' challenges (all currently trending in the wrong direction)

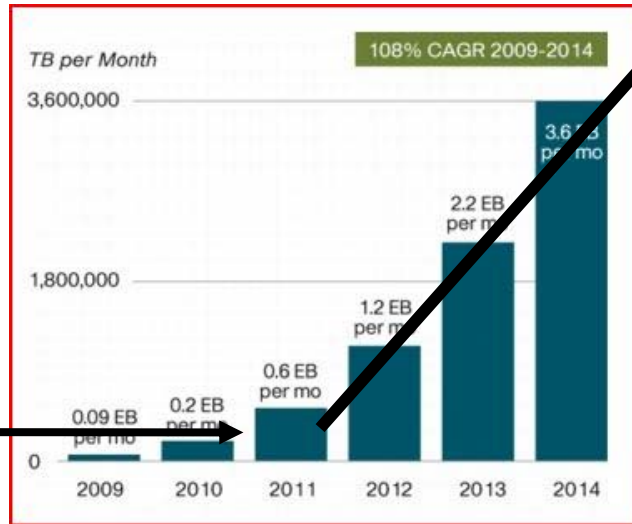
1. The Capacity challenge....

Rapid growth in demand is now a well established trend and forecast to continue well into the future

By 2012-13 penetration 35% Sales 70%



Lift-off starts now

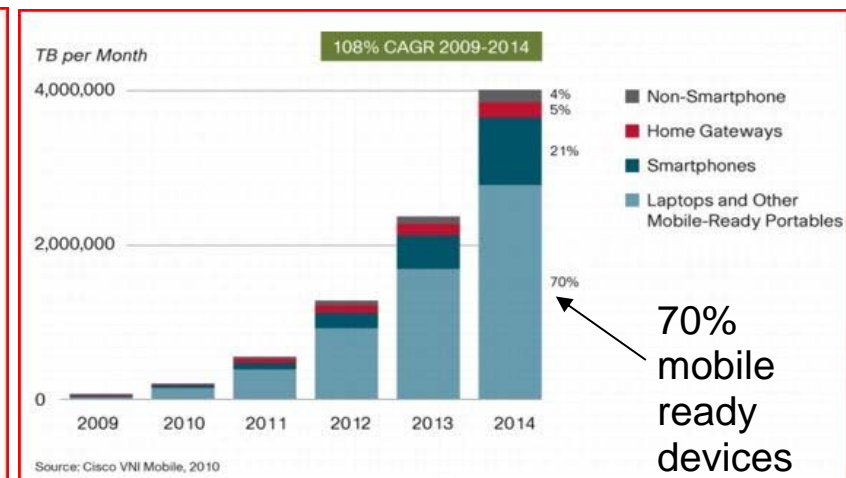


Demand

...unprecedented volumes of data driven by mobile portable devices and video



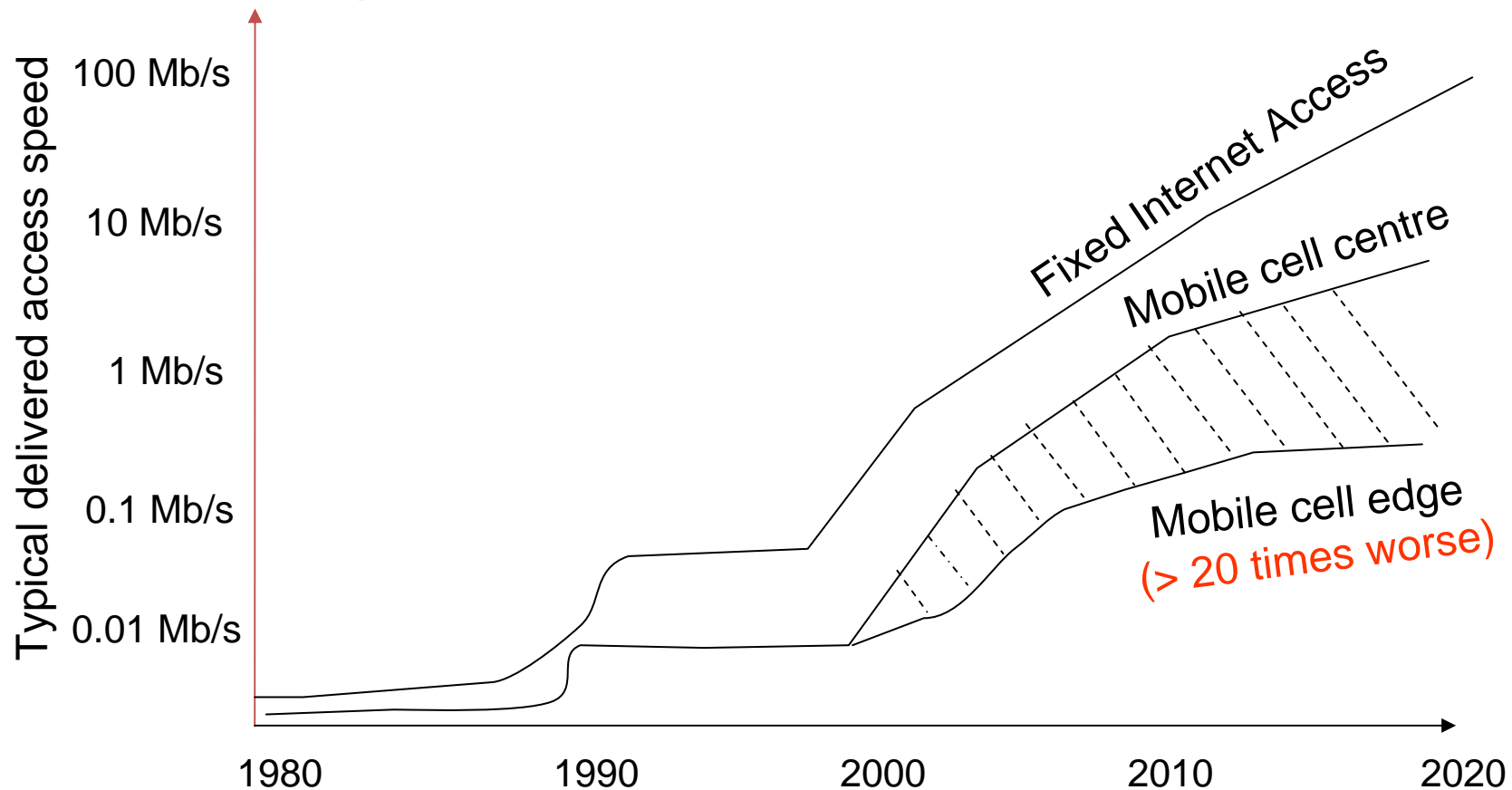
66% video



70% mobile ready devices

Source: Cisco

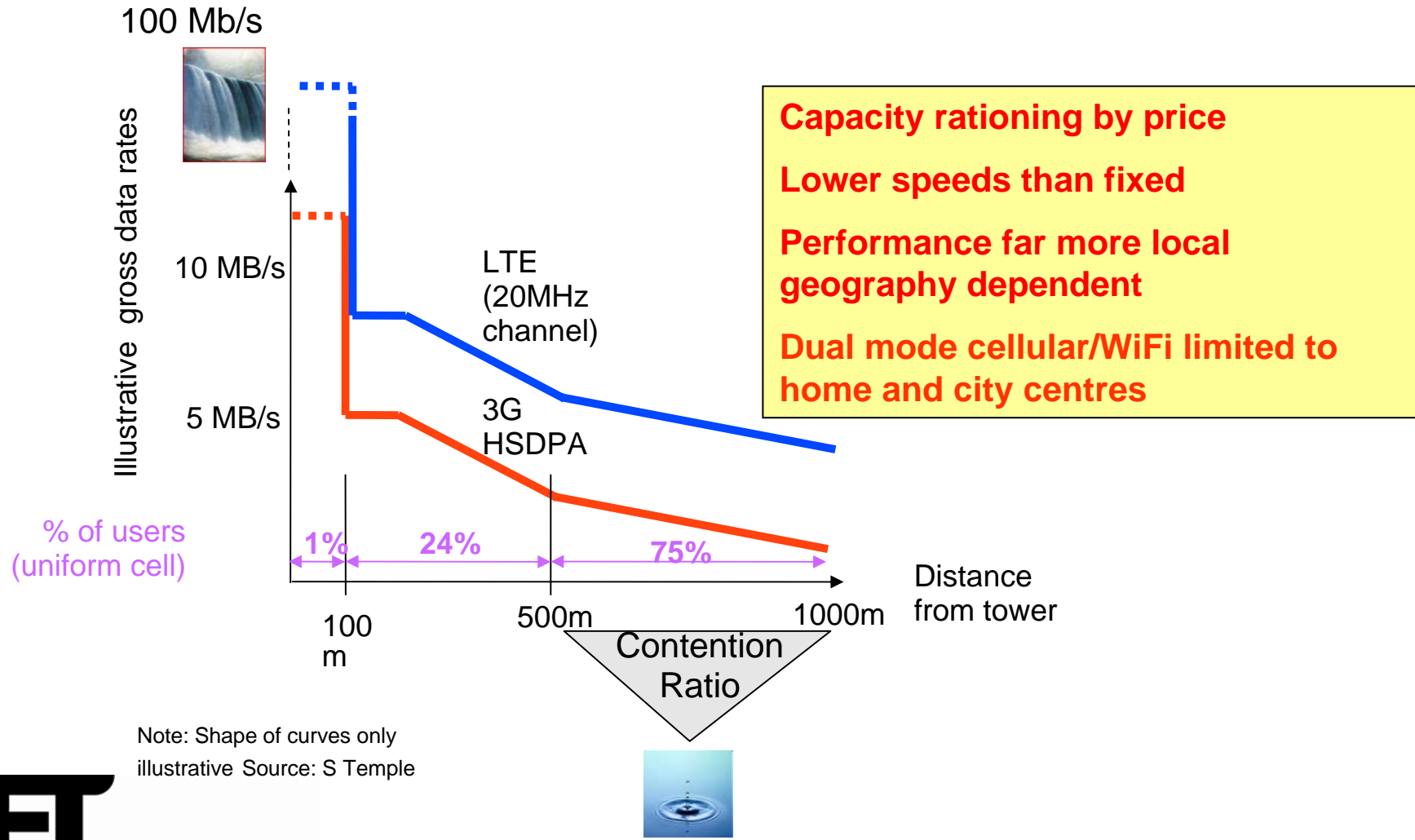
But mobile networks currently lack the capacity to allow them to keep up with both the capacity demand and the rising access speeds on the Fixed Broadband Networks



(Note- Semi-log scale is used for access speed distorts just how big the gap is going to become)

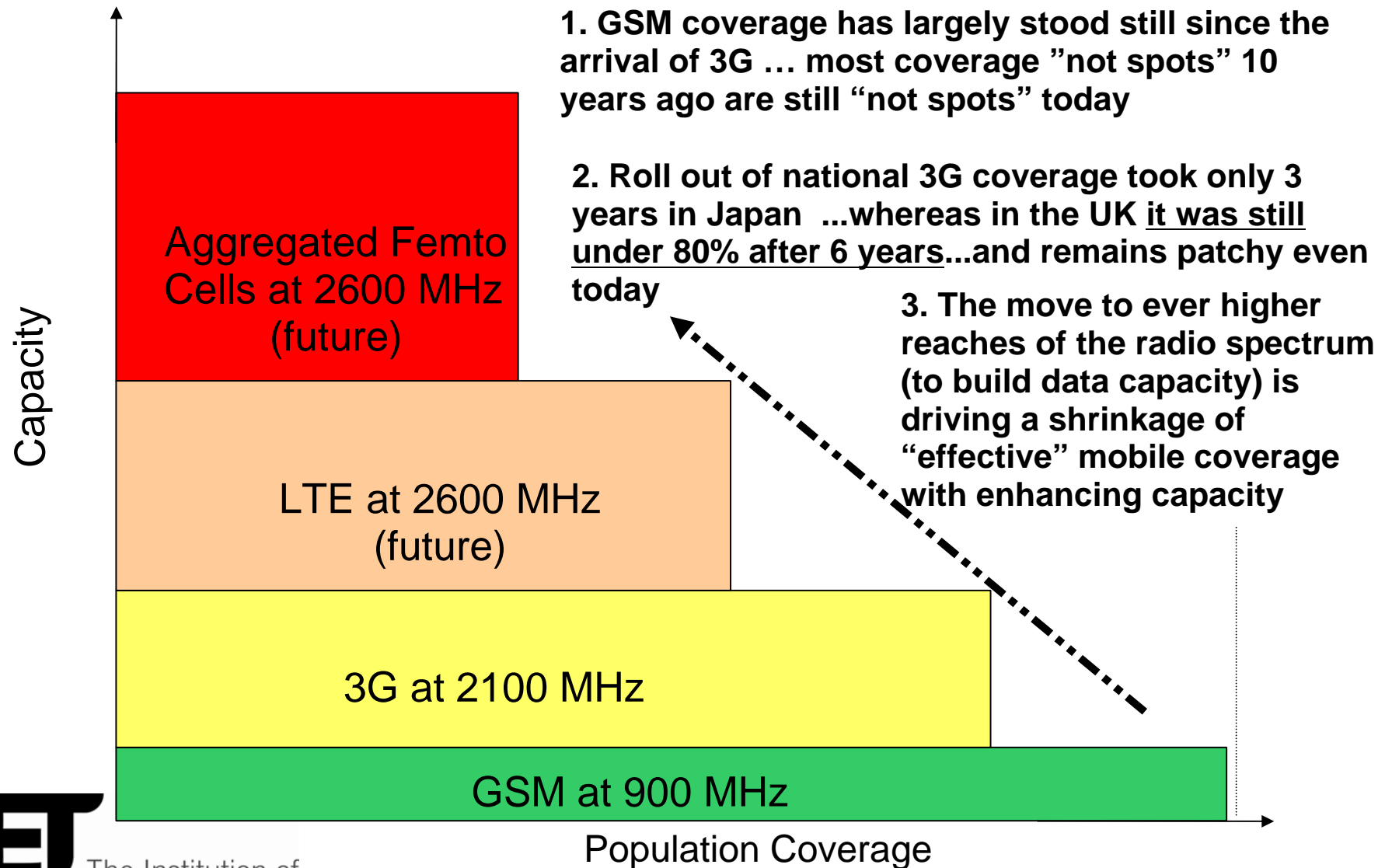
... and there are no easy technology or spectrum “fixes” around the corner

The future mobile communications trend *on the current trajectory* is:

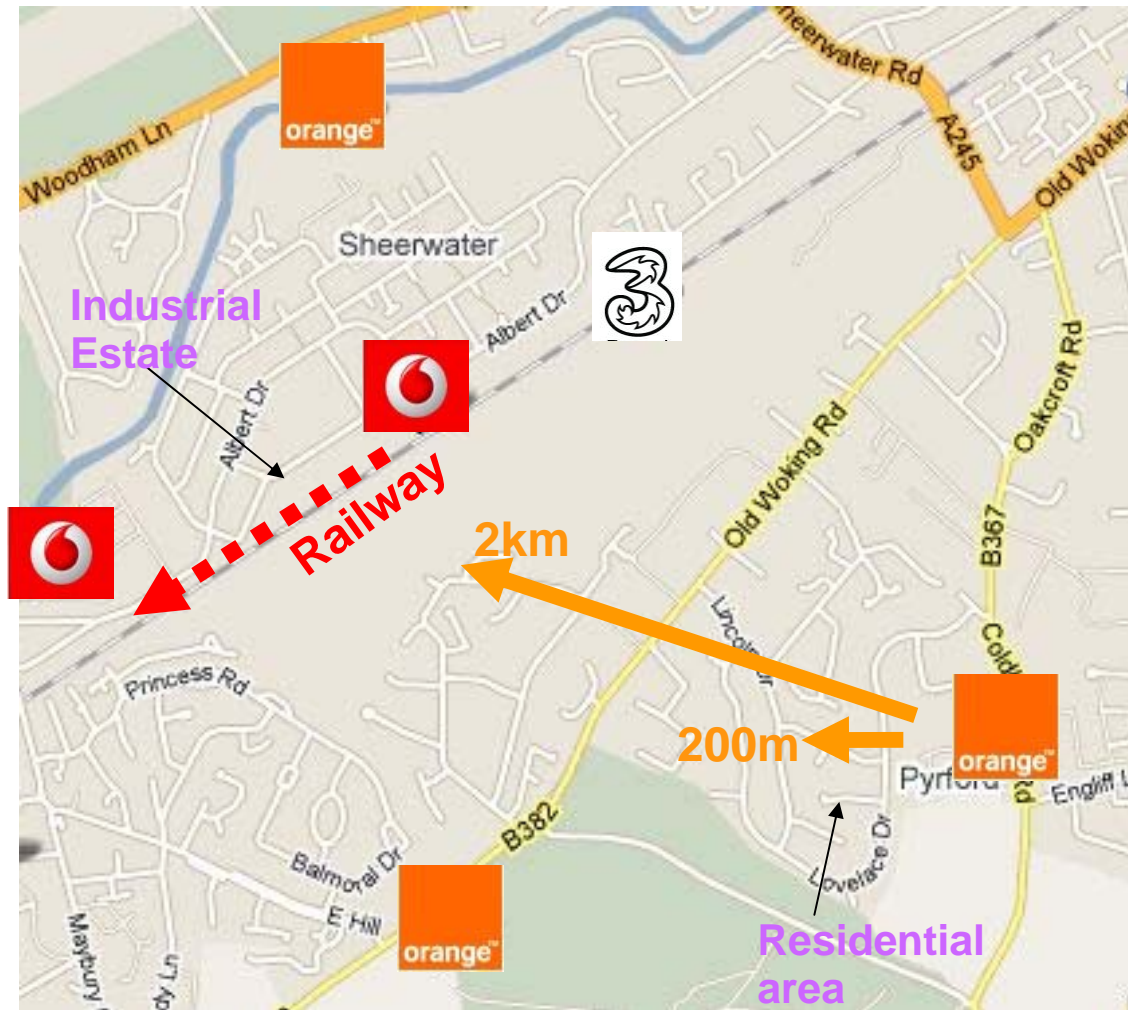


2. The Coverage challenge....

Mobile Network Coverage has been trending in the wrong direction for the past 10 years



Reliable coverage information for data will become a problem for consumers



Note: The map shows real mobile sites from the Ofcom site finder

Example of just how complex things are likely to become for consumers in the future mobile data access world:

- Loading on the Vodafone sites in the illustration could be heavily affected by passing trains from Woking main line sucking out local cell capacity
- Performance for Orange (EE) customers close to masts is heavily dependent on how many more distant customers Orange has attracted
- The home, place of work and journey between is likely to present quite different “best operator” options for data access...all very confusing

...all *made that bit worse* by a deterioration at the interface between mobile networks and mobile handsets that will eat into mobile network capacity and coverage

A glance at a spec from any mobile supplier shows that the one piece of information *that none of them reveal* is how good a mobile is as a radio receiver – anecdotal evidence is that the variation is enormous

Poor mobile antenna design or receiver sensitivity turns marginal coverage into poor or no coverage – and eats into network data capacity for everyone

As more frequency bands are being opened up for mobile radio so the handset industry have a huge challenge to pack in all the different antenna into the tiny space of a mobile phone and have all of them tuned to optimal performance

At the national level a new pro-investment regulatory approach will be essential to address inevitable mobile coverage market failures linked to aligned EU Regulations

At the EU level there is a growing case for revision of mobile type approval to cover a wider range of data devices and to include receiver performance in the Digital age

Note in passing: Whilst in theory mobile handsets can embrace all bands/technologies - mid to low tier models are likely to include only a sub-set – re-enforcing GSM as the only common thread across all mobiles in use – so GSM coverage will need to be sustained

3. The Regulatory challenge....

Regulation matters in shaping the future of a mobile infrastructure

The UK has passed through four generations of mobile communications technology – each a revolution in shaping the consumer experience

Less well known is that each of those technology revolutions was accompanied by **the release of new spectrum** and the introduction of **a new framework of regulation** that was decisive in shaping that revolution:

Technology	Government vision	Regulatory Model
BT System 4	Low priority elitist service	State Monopoly
1G – Analogue TACS	Widen access to mobile Introduce competition	New independent regulator Duopoly + service providers
2G – Digital GSM	Digitalise mobile radio European service area Consumer mass market	5-4 Mobile network operators Set up GSM MoU Fully liberalised terminals
3G – Mobile Broadband	Multimedia on the Move	Spectrum Auctions Consumer centric regulation Spectrum “equalisation” efforts

It is therefore quite normal to modernise mobile regulation every 10 years or so to match new ambitions and adapt to change

Network Competition is now weakening whilst retail competition is intensifying...putting into question the emergence of the right new mobile infrastructure platforms to support the creative industries and consumer choice for the mobile digital age

8-12 years ago the UK had a vigorous 4-5 player mobile network competition market... driving coverage improvements, innovation and lower prices

Coverage competition for GSM came to a halt 10 years ago, 3G roll-out was slow (not helped by high auction fees) and for data many fewer consumers now have a real choice of mobile operator

Information to allow consumers to make an informed choice of the best MNO for data speed will become more opaque due to the behaviour of the new advanced mobile technologies

Infrastructure sharing has been advancing under relentless cost pressures (competition and regulatory effects) . This has reduced network competition, coverage (site sharing) and speeds (back-haul and site sharing)...with a near BT monopoly of fibre backhaul over much of the UK becoming a major “bottleneck” for mobile

Industry consolidation has left a highly asymmetric market structure that is far from ideal...and lacking a fibre/wireless broadband balance

Current EU market definitions are lagging new patterns of competition with new regulations from adjacent sectors getting layered on top

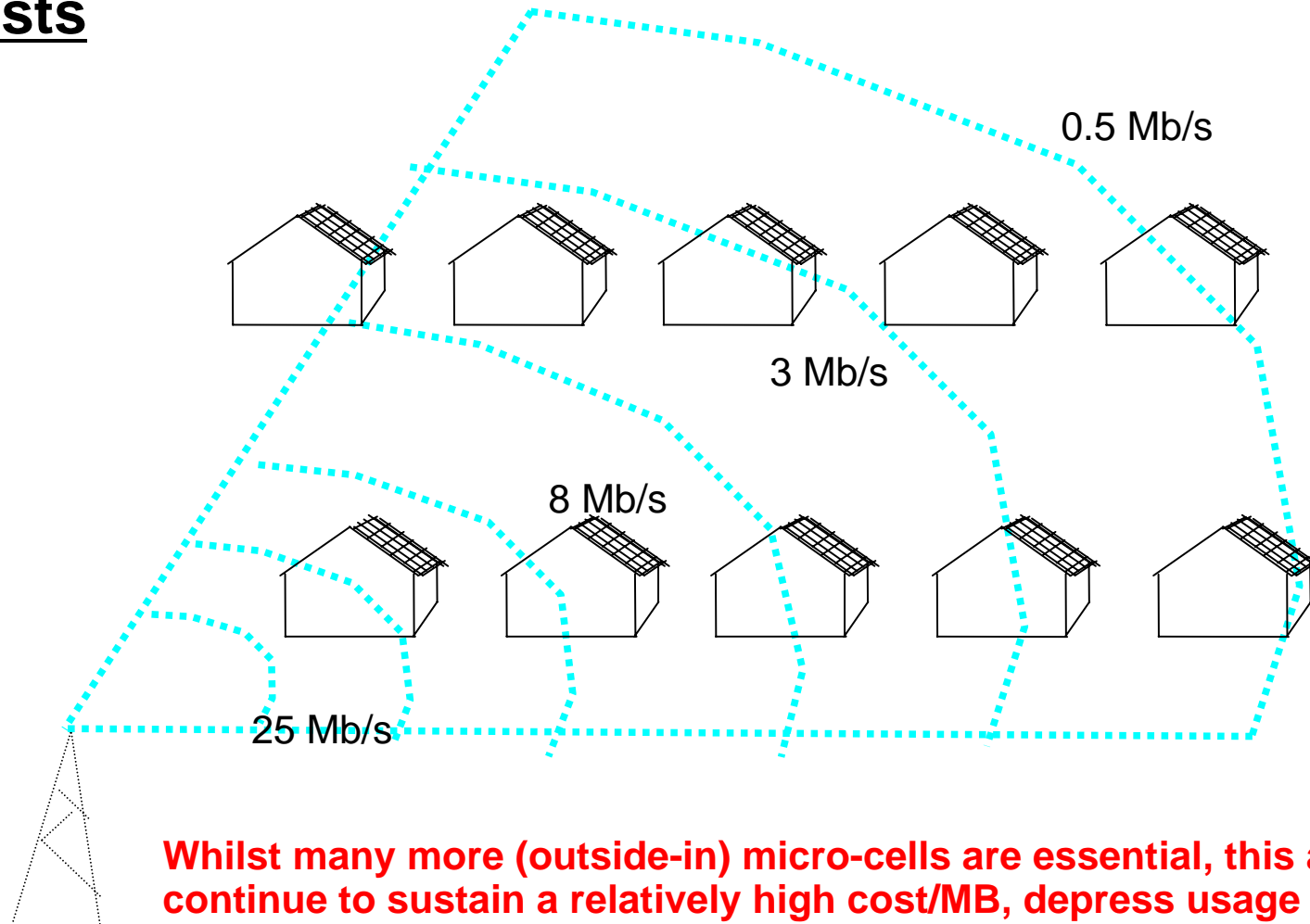
There has been a trend for the Civil Courts to become an interpreters of UK mobile regulation...leading to the UK already running 3 years behind other leading countries in rolling out LTE

..the present regulatory framework has now become part of the problem....

It is not possible to develop a new regulatory framework without the Government first defining what the country will need from its mobile radio infrastructure over the next 10 years:

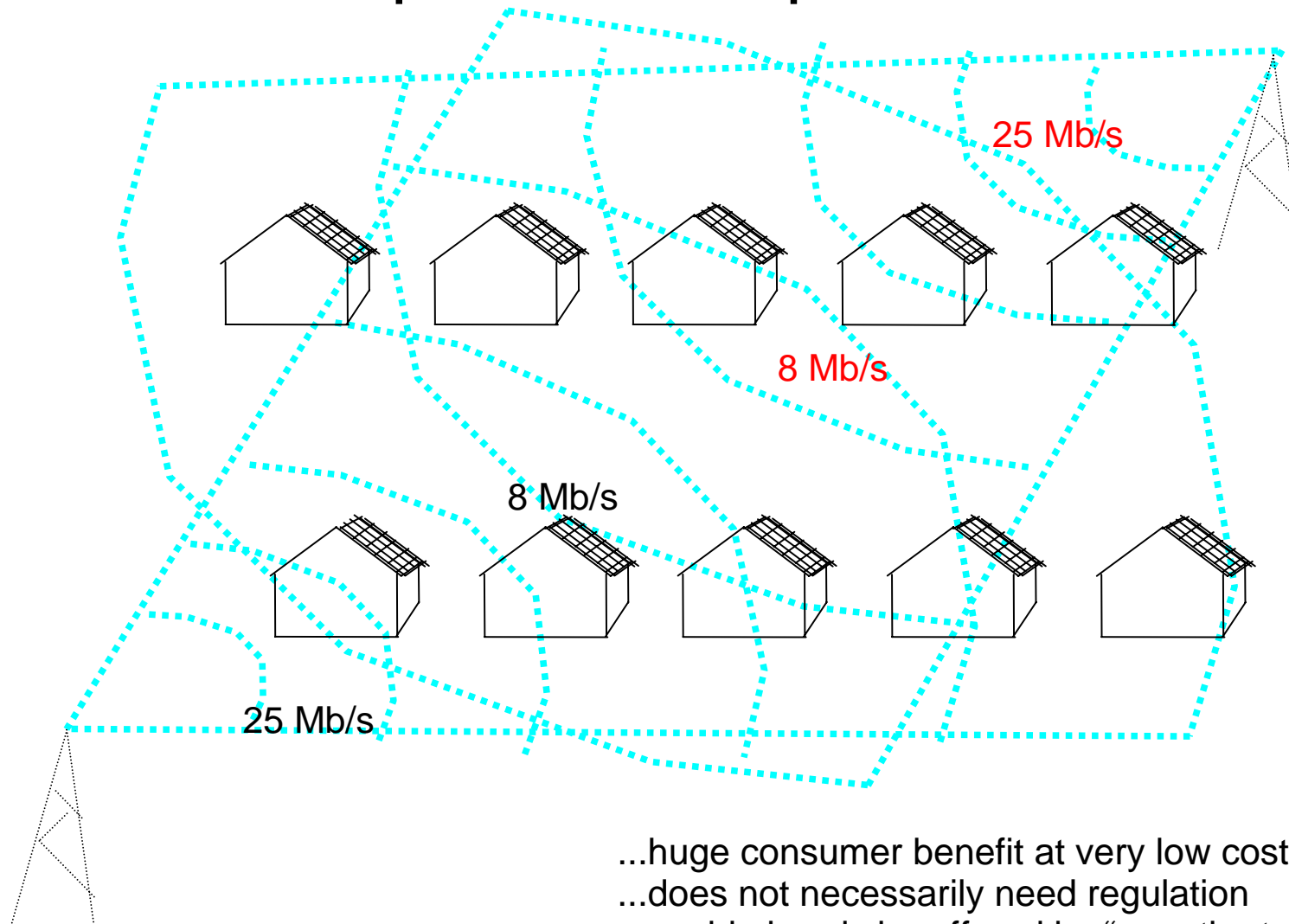
A possible road map to the UK having the best super-fast mobile communications infrastructure in Europe....

Cell splitting is necessary to increase mobile network capacity (and speeds) but will drive ever higher running costs



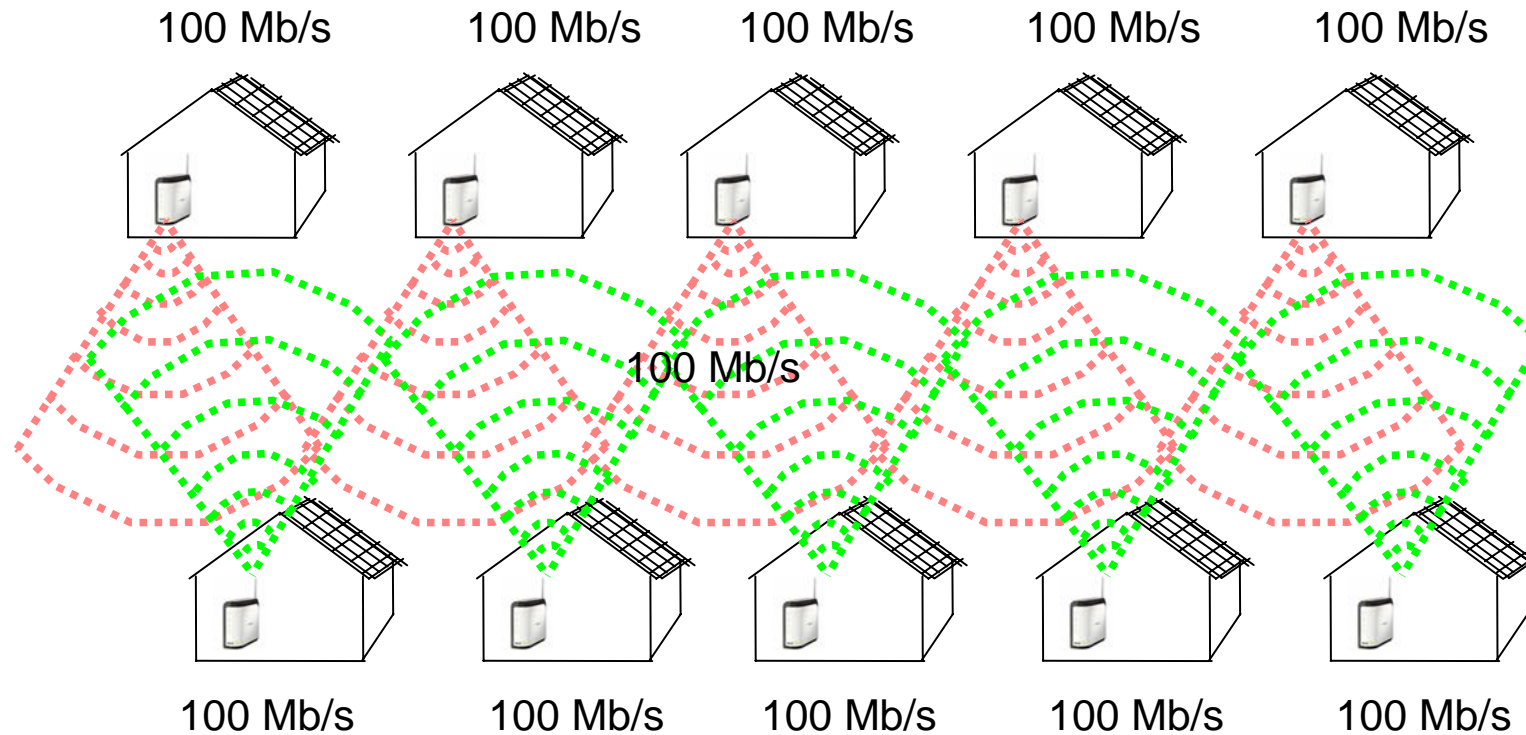
Whilst many more (outside-in) micro-cells are essential, this alone would continue to sustain a relatively high cost/MB, depress usage and stifle some high bandwidth innovations over mobile

Switching-on National Roaming for broadband mobile can boost mobile speeds and will help



- ...huge consumer benefit at very low cost..
- ...does not necessarily need regulation
- ...could already be offered by “over the top” players
- ...could be a premium service offered by MNO's

...even more revolutionary would be **Super High Density Wireless** delivering a quantum leap in mobile access speeds



Moves the mobile coverage world from *Outside-In* (cell splitting) to ***Inside-out*** (cell aggregation)

Could be delivered economically over all the top UK cities and towns, based upon usage of the (fibre-based) super-fast broadband infrastructure.

...that is economically viable over at least urban areas

... the number of WiFi units already in the market greatly exceeds the number to blanket cover the Top 10 UK Urban Centres ...but most users have switched on encryption ... isolating them into millions of disconnected little islands

... mobile operators (& others) are likely to be adding millions of additional WiFi and Femto Cells over the coming years *but “balkanised” into sub-critical densities*

Super High Density Wireless - is a new opportunity that comes from *harnessing what will already exist* but harmonised and organised into (an inside-out) single coordinated coverage zone

The BT FON initiative (an important pioneering development) has proved the public willingness to host semi-open “base stations”

Transforming the economics - Millions of base stations with “free” of rent, energy charges, back-haul costs and first line maintenance expenses versus 100’s of thousands of micro cells costing £ billions (for comparable performance)

Transforming the Customer Experience – Substantial urban coverage of 50-100 Mb/s reliable access speeds, *effectively coupling mobile speeds to the fixed Internet speeds*
...adding new “roaming” revenue streams for fixed ISP’s and MNO’s (aiding fibre deployment)

The challenge is how to catalyse it...and who catalyses it ... in today’s UK adversarial competitive market

And the prize...



...a new aspiration for a national mobile communications infrastructure - to support affordable services that delivers *“any content at any location”* at the right data speed (*without constraint*) to small inexpensive personal mobile devices

A Super High Density Wireless infrastructure offering a sustained 50-100 Mb/s access speed over (say 80%) of urban area...that could make the UK a hugely attractive location for inward investment

A more sustainable investment path to high performance mobile networks with considerably lower cost/MB – which translates into lower prices for consumers

A more “Net Neutral” mobile Internet that will drive new high bandwidth innovation

Much more capacity freed up on the wide area LTE networks to provide a considerably better service to the millions who will still depend upon them and particularly the edge of coverage performance

Entirely new revenue opportunities from a new layer of “roaming” service products that offer attractive price points for all segments of the market

Key Recommended Actions for the Government:

1. **Problem** – a country on the threshold of the next big investment cycle – with no idea of the mobile infrastructure it wants to finish up with by the end of the cycle.

Action: The Government needs to consult with the industry and define a national ambition for our mobile communications infrastructure with the big issues...

- a) capacity constrained or rich urban coverage ...
- b) <10Mb/s or >50 Mb/s access speeds ...
- c) network or services choice
- d) “pro long term investment” or “pro short term price” focussed regulation

2. **Problem** – retail competition is intensifying but the competition model for core national mobile infrastructure is progressively failing – *we will not get a workable competitive mobile broadband infrastructure without urgent reform.*

Action: Ofcom need to be given new powers to manage a less competitive network environment and particularly regarding coverage and back-haul. But those powers need to be tempered with new responsibilities for attracting investment (involving making finely balanced trade-offs) . It is not about more regulation...but the right regulation.

3. **Problem** – Over the next 10 years the industry will have to find new business models and some of those can only work on a more co-operative basis. But competitors cannot easily sit in a room inventing new co-operative business models.

Action: Either the Government need to take on the positive role of catalysing key “co-operative” changes or this role should be given to Ofcom. “Catalysing change” is a necessary new tool for change sitting between competition and regulation (and was used by Governments to turn GSM into a giant global success)

4. **Problem** – The government will discover that some of the much needed regulatory reforms can only be done at the EU level.

Action: The Government needs to make space in the Green Paper to collect together an agenda for ICT/telecoms pro-investment regulatory changes at the EU level and following through with dialogue with the Commission and other Member States...aligned with the 2025 ambition.

5. **Problem** – There is a need to take account of the interdependencies of the various National Infrastructures, both in broadband communications and more widely in transport, water and energy, as recognized in the National Infrastructure plan.

Action: The Government needs to make changes to the duties of Ofcom in particular to require it to consider the impact of communications regulation on other Critical National Infrastructures, and *vice versa* as part of Infrastructure UK

Note: The IET is willing to put its expertise at the disposal of Government to help define the right national ambition for UK mobile networks for the digital age.